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NEW AND RECONSIDERED SPECIES OF MICONIA (MELASTOMATACEAE) FROM COSTA RICA AND PANAMA

By

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ABSTRACT: Diagnoses, descriptions, and discussions are presented for five new Central American species of *Miconia (M. chiriquiensis and M. coloradensis from Panama, and M. confertiflora, M. grandidentata, and M. longibracteata from Costa Rica).* Diagnostic illustrations are provided for four of the novelties, and the new name *Miconia concinna* is proposed for a Panamanian endemic heretofore known as *Topobea micrantha.*

INTRODUCTION

In the four decades since Standley (1938) attempted to summarize knowledge of the Costa Rican Melastomataceae, increased botanical exploration in Costa Rica and adjacent Panama has resulted in the collection of much new material of the montane species of *Miconia*. Field and herbarium study of this genus for a comprehensive treatment of Melastomataceae for *Flora Costaricensis* reveals the need for nomenclatural changes, emended species descriptions, and recognition of several undescribed taxa. This paper places some of this new information on record now to make the names available to other researchers prior to completion of the floristic treatment.

Miconia chiriquiensis Almeda, sp. nov.

(Figure 1)

Sect. Cremanium. Frutex vel arbor parva 2– 4(–10) m. Ramuli teretes vel obscure rotundatoquadrangulati sicut folia primum paulo furfuracei mox glabrati. Petioli (5-)7-18(-25) mm; lamina 3.7–7.5(–10) × 1.5–4.6 cm chartacea elliptica apice caudato-acuminato basi acuta margine obscure serrulato. Panicula 4–6.5 cm longa glabra laxe multiflora; flores 5-meri, pedicellis 0.5–1 mm longis, bracteolis 0.5–1.5 × 0.5 mm caducis. Hypanthium (ad torum) 1 × 1 mm, lobis interioribus 0.5–1 mm altis late deltoideis apice obtuso, dentibus exterioribus acutis ca. 0.5 mm eminentibus. Petala 1.5 × 1.5 mm suborbicularia glabra. Stamina isomorphica glabra; filamenta 1.5 mm longa; antherarum thecae 0.75 × 0.5 mm paulo cuneatae poro 0.5 mm diam. ventraliter inclinato, connectivo non prolongato. Stylus 0.7–1 × 0.5 mm glaber; stigma subcapitatum; ovarium omnino inferum apice glabro.

Shrub or tree 2–4(–10) m tall. Internodes and distal branches \pm terete, essentially glabrous at maturity, but vegetative buds and young leaves commonly beset with a brownish furfuraceous indument. Leaves chartaceous, distantly ciliate-serrulate, 3.7–7.5(–10) cm long and 1.5–4.6 cm wide, elliptic, bluntly caudate-acuminate apically and acute basally, glabrous at maturity,



3-nerved or 3-plinerved (excluding inconspicuous submarginal pair) punctate and with a conspicuous network of secondaries below; petioles (5-7)7-18(-25) mm long and 1 mm broad. Inflorescence a laxly branched suberect to \pm pendant panicle 4-6.5 cm long; rachis \pm quadrate, glabrous throughout; bracteoles sessile, early-deciduous, 0.5-1.5 mm long and 0.5 mm wide, linear-oblong, entire. Pedicels 0.5-1 mm long. Hypanthia (at anthesis) campanulate, 1 mm long to the torus, glabrous. Calyx lobes (on fruiting hypanthia) persistent, glabrous, semicircular or depressed-triangular with entire to irregularly, \pm hyaline margins, 0.5–1 mm long and about 1 mm wide; calyx teeth persistent, subulate, \pm appressed to and shorter than mature calyx lobes. Petals 5, erect to antrorsely spreading, glabrous, \pm concave, white or greenish white, suborbicular, entire, 1.5 mm long and wide. Stamens 10, isomorphic, incurved toward central axis of flower at anthesis; filaments glabrous, subulate, white to translucent, mostly 1.5 mm long and 0.5 mm wide basally; anthers about 0.75 mm long and 0.5 mm wide distally, white, \pm infundibuliform to obliquely cuneate in profile view, shallowly emarginate dorsally, the pore oblong and ventrally inclined; connective simple, inconspicuous and lacking prolongations or appendages. Ovary inferior. Style straight, glabrous, 0.7–1 mm long; stigma subcapitate. Berry globose, 2-3 mm long to the torus and 2-3.5 mm in diameter. Seeds \pm pyriform, beige, papillate. mostly 0.7-1 mm long.

TYPES.—Panama. Chiriquí: about 8 km w of Cerro Punta, vicinity of Las Nubes, elevation 6100–6400 ft [1859–1951 m], 11 Feb. 1978, *Almeda & Nakai 3535* (holotype: CAS!; isotypes: C!, DUKE!, F!, MO!, PMA!, US!).

ADDITIONAL SPECIMENS EXAMINED.—Panama. Chiriquí: vicinity of Las Nubes, 2.7 miles [4.3 km] NW of Río Chiriquí Viejo, W of Cerro Punta, *Croat 22392* (CAS, DUKE, MO), *Croat 22425* (MO, US); Bajo Chorro, Boquete, *Davidson 181* (US), *Davidson 390* (MO).

DISTRIBUTION.—A little-collected cloud-forest species apparently restricted to Chiriqui province in western Panama at elevations of 1850–2200 m. Available specimens, all of which were collected in February, are in flower and fruit.

Miconia chiriquiensis is apparently rare and occurs in a region which continues to yield new and narrowly endemic taxa. Diagnostic features include the ciliate-serrulate, elliptic leaves that are caudate-acuminate apically, short (0.5–1 mm), linear-oblong, early-deciduous bracteoles, concave, suborbicular petals, geniculate filaments, and minute (0.75 \times 0.5 mm), 4-celled anthers.

In his account of Miconia for the Melastomataceae of Panama, Gleason (1958) referred this entity to M. rubens (Sw.) Naud. Study of his description and examination of selected cited specimens indicate that Gleason also confused M. chiriquiensis with the taxon treated here as M. concinna. The latter differs markedly from M. chiriquiensis by virtue of its epiphytic habit, trichotomously branched, corymbiform panicle, and distinctive androecial morphology. In foliar size and shape the new species bears a strong resemblance to M. rubens, which is known only from Jamaica and Venezuela. Miconia rubens does differ conspicuously, however, by the somewhat swollen nodes, ferrugineous pubescence on distal nodes and juvenile foliage, marginally fimbriate bracteoles, dioecious floral condition, peltate stigma, and cuneate, apically truncate anthers. Although M. chiriquiensis resembles M. rubens most closely in the totality of its vegetative characters, it is difficult to present meaningful speculation regarding the origin and exact relationships of these taxa. Aside from the possibility of evolutionary convergence, the most logical alternative hypothesis is that M. rubens is a close relative and possibly dioecious derivative of M. chiriquiensis.

Miconia coloradensis Almeda, sp. nov. (Figure 2)

Sect. Amblyarrhena. Herba l m alta (fide collectore). Ramuli glabri primum obscure subquadrangulati demum teretes. Petioli 3– 7.5 × 1.5–3 cm; lamina 13.5–20.5 × 9.8–17 cm

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FIGURE 1. *Miconia chiriquiensis* Almeda. A, habit, $\times \frac{1}{2}$; B, representative leaves, lower surface (left) and upper surface (right), $\times 1$; C, seeds, $\times 12$; D, mature berry, $\times 8$; E, stamens, ventral view (left) and lateral view (right) \times ca. 10; F, petal, \times ca. 8; G, fully expanded flower showing natural posture of petals and stamens (left), floral bud and pedicellar bracteoles (right), $\times 9$. (A-G from Almeda & Nakai 3535.)

chartacea vel subcoriacea denticulata cordata apice acuminato vel cuspidato, 9-11-nervata, supra glabra et paulo reticulato-bullata, subtus in superficie pilis stellatis obsita. Panicula 7–19 cm longa multiflora; flores (4-)5-meri, 1.5-5 mm pedicellati, bracteolis 3-6 mm longis obovatis vel spathulatis valde caducis. Hypanthium (ad torum) 2.5 \times 2 mm, lobis interioribus 1 mm altis rotundatis vel truncatis, dentibus exterioribus crassis ca. 0.5 mm eminentibus. Petala 3-5.5 × 2-4 mm obovata. Stamina isomorphica glabra; filamenta 2.5 mm longa; antherarum thecae 2.5×1 mm anguste obovatae poro 0.5-0.75mm diam. paulo ventraliter inclinato; connectivum nec prolongatum nec appendiculatum. Stylus 5×0.5 mm glaber; stigma subcapitatum.

Herb to 1 m tall (according to collectors). Cauline internodes glabrous, subquadrangular to \pm terete. Leaves \pm bullate above, chartaceous to subcoriaceous, denticulate, 13.5-20.5 cm long and 9.8-17 cm wide, cordate, acuminate to cuspidate apically, 9-11-nerved with a prominulous network of secondary and tertiary nerves below, glabrous and green above, red to purple and moderately beset with sessile stellate trichomes on and between primary and secondary nerves below; petioles 3-7.5 cm long and 1.5-3 cm broad, each petiole bearing an abaxial, humplike protuberance proximal to nodal junction. Inflorescence a laxly branched terminal panicle 7-19 cm long; rachis \pm rounded to subquadrangular, moderately stellate pubescent; bracteoles sessile, early deciduous, 3-6 mm long and 1.5-3 mm wide, obovate to spatulate, erose to denticulate, \pm enveloping young buds and pedicels, glabrous above, sparsely to moderately stellate below. Pedicels 1.5-5 mm long, beset with sessile stellate trichomes. Hypanthia (at anthesis) narrowly campanulate, mostly 2.5 mm long to the torus, moderately to sparsely stellate pubescent. Calvx lobes (on fruiting hypanthia) persistent, glabrous, erect, broadly semicircular but \pm truncate apically, entire to somewhat erose, 1 mm long and about 2 mm wide; calyx teeth persistent, bluntly subulate or knoblike, appressed to and shorter than the calyx lobes on mature berries. Petals mostly 5, but 4 in some flowers, reportedly pink, obovate, entire, rounded to irregularly emarginate at apex, 3-5.5 mm long and 2-4 mm wide. Stamens 10, but 9 in 4merous flowers, isomorphic; filaments straight,

subulate, thickened and somewhat fleshy, at least basally, 2.5 mm long; anthers 2.5 mm long and mostly 1 mm wide distally, yellow, obovoid, border of apical pore \pm emarginate ventrally but truncate dorsally; connective inconspicuous and without prolongations or appendages. Ovary inferior. Style straight, 5 mm long, glandular-ciliate basally, otherwise glabrous; stigma subcapitate. Berry \pm globose, 4.5–5.5 mm long to the torus and 5–5.5 mm in diameter. Seeds galeiform, nitid, smooth to obscurely papillate, 0.5 mm long.

TYPES.—**Panama.** Bocas del Toro/Chiriquí border: Cerro Colorado along intersection of Bocas Road with main ridge road, 15.4 km from Chami along ridge road, elevation 1400–1700 m, 24 Oct. 1977, *Folsom 6143* (holotype: CAS!; isotype: MO).

ADDITIONAL SPECIMENS EXAMINED.—Panama. Chiriquí: Cerro Colorado, Bocas Road, Folsom & Collins 1748 (CAS, MO).

DISTRIBUTION.—Known only from Cerro Colorado in western Panama at an elevation of 1400–1700 m. Flowering and fruiting specimens have been collected in February and October.

This distinctive species is characterized by a lax, elongate inflorescence, truncate calyx lobes, nitid, galeiform seeds and cordate, denticulate leaves clothed abaxially with sessile, stellate trichomes. In the few collections available for study, the inflorescence is consistently terminal but superficially appears to diverge from a lateral position because of the overtopping effect created by lengthening of proximal axillary shoots. The characteristic number of floral parts has been difficult to determine on the basis of material at hand. The inflorescence on the holotype has both 4-merous flowers with nine stamens and 5-merous flowers with ten stamens, but the significance of this variation cannot be properly assessed without a more extensive series of specimens.

The relationships of this species are unclear. Assuming sect. Amblyarrhena represents a natural grouping, it is tempting to suggest that M. coloradensis diverged from the Andean stock that gave rise to M. andreana Cogn. of Colombia and M. gibba Markgraf of Ecuador. The former differs from M. coloradensis in having longer leaves (2–3.5 dm), a furfuraceous pubescence, linear-oblong to subulate bracteoles, and a compact inflorescence with ultimate units consisting of congested glomerules. Aside from striking differences in inflorescence size and structure,



FIGURE 2. Miconia coloradensis Almeda. A, habit, \times ca. $\frac{1}{3}$; B, stamens, ventral view (left) and $\frac{3}{4}$ lateral view (right), \times ca. 6; C, mature berry, $\times \frac{3}{2}$, D, stellate trichomes, \times ca. 35. E, petal, $\times 7$; F, seeds, $\times 16$. (A–F from the holotype.)

the new species approaches M. gibba in overall foliar length and shape. Petioles of the latter are shorter (1.5–2 cm), and the leaves are 7-nerved, caducously furfuraceous below, and bigibbous dorsally at the base.

Miconia concinna Almeda, nom. nov.

Topobea micrantha Pittier, J. Wash. Acad. Sci. 14:451. 1924. Nec Miconia micrantha Cogn. (Bull. Torrey Bot. Club 23:16. 1896) nec M. micrantha Pilger (Verh. Bot. Ver. Brand. 47:173. 1905; *M. wittii* Ule, nom. nov., Notizbl. Bot. Gart. Berl. 6:367. 1915) nec *M. micrantha* Pittier (Bol. Soc. Venez. Cienc. Nat. 11:27. 1947; *M. tabayensis* Wurdack, nom. nov., Phytologia 21:359. 1971).

Study of the holotype and recently collected material of this entity reveals some inaccuracies in Pittier's incomplete Latin diagnosis. It seems appropriate, therefore, to present the following emended species description.

Epiphytic shrub with lax arching branches to 2 m long. Cauline internodes terete, the distal branches glabrous and \pm vernicose on drving. Leaves of a pair isomorphic to anisomorphic, chartaceous, ciliate-serrulate (the trichomes mostly 1-2 mm long), 1.7-4.7 cm long and 1.4-3 cm wide, elliptic to elliptic-ovate acuminate apically and acute basally, sparsely pubescent to glabrate at maturity but usually lepidote to brown-punctate below, sparsely brown furfuraceous to glabrous above, the pubescence usually tardily deciduous and imparting a brown-punctate appearance, 3-nerved with a network of secondaries mostly 1-2 mm apart; petioles 5-20 mm long, 1 mm broad. Inflorescence a pendant, congested, trichotomously branched corymbiform panicle 1-1.5 cm long (shorter than foliage leaves borne at the node initiating the inflorescence) borne on a stout peduncle 2-5 mm long; bracteoles sessile, foliaceous, persisting on the infructescence, oblanceolate to narrowly spatulate, 3-6(-10) mm long, 1-2 mm wide, glabrous to sparsely furfuraceous. Pedicels terete, glabrous, mostly 0.5 mm long. Hypanthia (at anthesis) glabrous, campanulate, 1-1.5 mm long to the torus and 1-1.5 mm broad. Calvx lobes (on fruiting hypanthia) \pm ascending, persistent, semicircular but varying to rounded-deltoid, entire to minutely lacerate, 1 mm long and 1.5 mm wide at base between sinuses; calyx teeth persistent, triangular, 0.5 mm long. Petals 5, ± erect to antrorsely spreading, glabrous, \pm concave, white but sometimes vellowish on drving. suborbicular, entire, 2-2.5 mm long and wide. Stamens 10, isomorphic; filaments glabrous, subulate, distally geniculate, 2-2.5 mm long; anthers 0.5 mm long, \pm cuneate, broadly flared and terminated by a \pm ovoid ventrally inclined pore; connective thickened and prolonged $(0.5 \times 0.5 \text{ mm})$ below thecae, truncate to shallowly bilobed in ventral view, dilated dorsally into a blunt projecting appendage in profile view. Ovary ca. 4/5 inferior. Style straight, glabrous, 3 mm long; stigma \pm clavate to subcapitate. Berry reportedly black at maturity, 2-2.5 mm long to the torus, 2.5–3 mm in diameter. Seeds \pm pyriform, smooth and nitid, mostly 0.75 mm long.

border, ca. 16 km NW of El Hato del Volcán, Mori & Bolten 7291 (CAS), Mori & Bolten 7301 (CAS).

DISTRIBUTION.—Apparently a localized cloudforest epiphyte endemic to Chiriquí province in western Panama at elevations of 2000–2500 m. Flowering and fruiting specimens have been collected in January, March, and July.

Miconia concinna is recognized by its lax, arching branches, adaxial furfuraceous indument on juvenile foliage, large, persistent, foliaceous floral bracts, and pendant, few-flowered corymbiform inflorescences that are markedly shorter than subtending foliage leaves.

Pittier's (1924) initial placement of this species in *Topobea* is difficult to understand, since his discussion makes note of several features which made this decision questionable. In choosing this course, Pittier was apparently impressed by the presence of conspicuous foliaceous floral bracteoles and by the position of the inflorescence, which he erroneously described as axillary. In describing this species as a tree, it also seems likely that Pittier mistook its habit for that of its host. Label Information for all recently gathered material indicates that this species is an epiphyte, and until noted otherwise, it seems advisable to accept this habital description as characteristic of the species.

On the basis of limited material, Standley (1938) misinterpreted M. concinna to be conspecific with the Costa Rican endemic described here as M. longibracteata. This confusion was compounded when he referred specimens of these two taxa to M. myrtillifolia Naud., a species of Andean Colombia and Venezuela which differs in having quadrate branchlets, a longer (2-4 cm), erect panicle, and very different oblong anthers with diminutive apical pores and unprolonged connectives. More recently, Gleason (1958) included M. concinna in his misconstrued concept of M. rubens (Sw.) Naud. The latter, a dioecious species, is known only from Jamaica and Venezuela and differs most notably by its elongate multiflowered inflorescence, inconspicuous bracteoles, ± swollen nodes, and different anther morphology.

In foliar shape and floral details, *M. concinna* and *M. longibracteata* are more similar to each other than to any other species of the genus, and there is little doubt that they were derived from common ancestral stock. Available collections suggest that these two species are allopatric, with the range of *M. concinna* lying south of

SPECIMENS EXAMINED.—Panama. Chiriqui: humid forests on precipitous slopes of Cerro de la Horqueta, *Pittier 3276* (US, holotype of *T. micrantha*); s slopes of Cerro Horqueta N of Boquete, *Wilbur, Teeri & Foster 13490* (CAS, DUKE); Cerro Pando, on continental divide and Panama/Costa Rica

that of M. longibracteata. The prevailingly glabrous leaves, early-deciduous floral bracteoles, and laxly branched, elongate panicle of M. longibracteata serve to separate these species most readily.

Miconia confertiflora Almeda, sp. nov. (Figure 3)

Sect. Chaenopleura. Frutex epiphyticus ca. 2 m altus. Ramuli sulcato-quadrangulati sicut folia inflorescentia plerumque glabri. Petioli 3-16(-20) mm; lamina $1.7-7 \times 1-3.4$ cm elliptica, elliptico-ovata vel obovata apice acuta vel acuminata basi acuta, 3(-5)-nervata, chartacea et serrulata. Panicula corymbiformis, pedunculo plus minusve 1.5 cm longo; flores 5-meri breviter (1 mm) pedicellati, bracteolis 1.5-2.5(-4) mm longis valde caducis. Hypanthium (ad torum) 1.5×1 mm, lobis interioribus 0.5–1 mm altis late deltoideis vel rotundatis, dentibus exterioribus acuminatis 0.5-1.5 mm longis. Petala 1- 1.5×0.5 –1 mm ovata apice acuto vel paulo uncinato. Stamina isomorphica glabra; filamenta 1–1.5 mm longa; antherarum thecae 0.75–1 \times 0.25-0.50 mm anguste oblongae, connectivum nec prolongatum nec appendiculatum. Stylus 2×0.5 mm glaber; stigma truncatum non expansum.

Epiphytic shrub to 2 m tall, distal branches quadrangular with carinate to narrowly alate angles, entirely glabrous but bearing a pair of \pm pustulate setiform appendages at opposing nodal faces. Leaves chartaceous, glabrous, 1.7-7 cm long and 1-3.4 cm wide, basally entire but distally serrulate, elliptic but sometimes varying to elliptic-ovate or obovate, acute to acuminate apically and acute basally, 3(-5)-nerved with a conspicuous network of secondary nerves, dark green above, pale green and occasionally punctate below; petioles 3-16(-20) mm long and about 1 mm broad. Inflorescence a multiflowered corymbiform panicle with flowers borne in congested terminal glomerules; rachis glabrous, quadrangular, mostly less than 1.5 cm long; bracteoles sessile, glabrous, early-deciduous, 1.5-2.5(-4) mm long and 0.5-1 mm wide, linearsubulate. Pedicels 1 mm long. Hypanthia (at anthesis) campanulate, glabrous, 1.5 mm long to the torus. Calyx lobes (on fruiting hypanthia) persistent, erect, broadly deltoid to \pm rounded, entire with conspicuous hyaline margins, 0.5-1 mm long and 1 mm wide; calyx teeth persistent, subulate to setiform, equaling or commonly exceeding calvx lobes on mature berries. Petals 5. glabrous, erect and \pm concave at anthesis, white but tinged with red externally, narrowly to broadly ovate, entire, acute to bluntly uncinate apically, 1-1.5 mm long and 0.5-1 mm wide. Stamens 10, isomorphic, erect to slightly incurved at anthesis; filaments white, ± translucent, subulate, 1-1.5 mm long; anthers 0.75-1 mm long and 0.25-0.50 mm wide basally, glabrous, white, narrowly oblong but \pm obovoid in profile view, distally rounded with a subterminal, oblong ventrally inclined cleftlike pore, the margins of which often form a \pm elevated hvaline border; connective thickened, not conspicuously dilated or prolonged dorsally but commonly \pm prolonged ventrally below thecae. Ovary wholly inferior. Style straight, 2 mm long; stigma truncate. Berry purple at maturity, \pm globose, 3-3.5 mm long to the torus and 3.5 mm in diameter. Seeds narrowly ovoid with an enlarged, \pm flattened lateral raphe, densely papillate on the convex surface, mostly 2 mm long and 1 mm broad.

TYPES.—Costa Rica. San José: about 18 km N of San Isidro de Coronado off C.R. #216 on lower w slopes of Volcán Irazú, elevation 1700–1800 m, 5 July 1977, *Almeda et al. 2908* (holotype: CAS!; isotypes: CR!, F!, MO!, US!).

ADDITIONAL SPECIMENS EXAMINED.—Costa Rica. Heredia: slopes NE of Cerro Chompipe about 16 km NNE of San Rafael, Wilbur, Almeda & Daniel 22249 (CAS, DUKE); Cerro Zurquí, NE of San Isidro, Standley & Valerio 50542 (US), Standley & Valerio 50644 (US); saddle area between Cerro Chompipe and sE flank of Volcán Barba off secondary road N of C.R. Hwy #113 connecting with Calle Gallito, Baker, Utley & Utley 232 (CAS, DUKE). San José: 5 km NE of Cascajal, Almeda & Nakai 3611 (CAS); 3–6 km beyond Las Nubes in vicinity of Cascajal, Almeda 2636 (CAS); about 7 km by road NE of Cascajal and 14 km NE of San Isidro de Coronado, Wilbur 19816 (DUKE); 3–5 km NE of Cascajal in vicinity of Rio Cascajal, Wilbur 24420 (DUKE); about 3 km NE of Cascajal and 9 km NE of San Isidro de Coronado, Wilbur 19787 (DUKE).

DISTRIBUTION.—A local cloud-forest epiphyte apparently endemic to the Cordillera Central of Costa Rica at elevations of 1600–2400 m. Flowering and/or fruiting specimens have been collected in February, March, July, October, and December.

Field observations and label information of known collections indicate that this species is an obligate epiphyte. Extirpation of moist forests within the limited range of this taxon poses a real threat to its survival. Fortunately, some individuals persist as inhabitants of remnant pas-



FIGURE 3. *Miconia confertiflora* Almeda. A, habit, $\times 4$; B, representative leaves, upper surface (left) and lower surface (right), $\times 3$; C, fully expanded flower showing petals and stamens, $\times 9$; D, petal, $\times 16$; E, stamens, ventral view (left) and lateral view (right), $\times 13$; F, mature berries with persistent calyx lobes and calyx teeth, $\times 3$; G, seeds, $\times 6$. (A-G from Almeda et al. 2908.)

ture trees long after surrounding vegetation has been cut away.

This new species is readily separated from congeners by its quadrangular branchlets, distally serrulate leaves, congested corymbiform inflorescence, glabrous hypanthia, prominent calyx teeth, and narrowly ovoid seeds that are densely papillate on the convex side. The small, inconspicuous anthers are also noteworthy in having subterminal, oblong pores, the margins of which are elevated into a low, continuous, hyaline border. This feature becomes distorted with pressing and drying and is best observed in pickled or hydrated material.

Miconia confertiflora superficially resembles M. chionophylla Naud. of sect. Chaenopleura, which ranges from Andean Colombia to Bolivia. The latter differs in its procumbent or scandent habit, puberulent branchlets and petioles, smaller leaves $(1-1.5 \times 0.7-1.3 \text{ cm})$, 4-merous flowers, and capitate stigma. The congested inflorescence of *M. confertiflora* is also reminiscent of that found in *M. parvifolia* Cogn. (of sect. *Cremanium*), another high-elevation Colombian species easily separated by its dwarf shrubby habit (2-3 dm tall), smaller, revolute leaves (8– 15 mm long), ovate, apically truncate petals, and copious stellate pubescence on distal branchlets.

Miconia grandidentata Almeda, sp. nov.

Sect. Chaenopleura. Frutex epiphyticus ca. 1 m altus. Ramuli sulcato-quadrangulati sicut folia novella primum modice vel dense pilis stellatis induti mox glabrati. Petioli 4-15(-19) mm; lamina $3-6 \times 1.8-3.5$ cm elliptica vel ellipticoovata apice acuto vel acuminato basi acuta, 3(-5)-nervata, chartacea obscure distanterque serrulata. Panicula 3-5.3 cm longa multiflora; flores 5-meri breviter (1-2 mm) pedicellati, bracteolis conspicuis (1-)3-6 mm longis persistentibus. Hypanthium (ad torum) $2-2.5 \times 2 \text{ mm}$, lobis interioribus 0.5 mm altis late deltoideis vel rotundatis, dentibus exterioribus subulatis 2 mm longis. Petala 1.5-2 × 1 mm plus minusve ovata apice uncinato. Stamina isomorphica glabra; filamenta 2 mm longa; antherarum thecae 0.75- 1×0.5 mm oblongae, rectae vel paulo curvatae poro ventraliter inclinato, connectivo ad basim dorsaliter dente hebeti truncato glabro ornato. Stylus 2×0.5 mm glaber; stigma truncatum non expansum.

Epiphytic shrub to 1 m tall, distal branchlets moderately to densely stellate, quadrangular with carinate to narrowly alate angles. Older branches somewhat corky on drying, cracking and excorticating in age. Leaves chartaceous, entire but obscurely serrulate distally, 3-6 cm long and 1.8-3.5 cm wide, elliptic to ellipticovate, acute to acuminate apically and acute basally, glabrous at maturity but clothed with brown stellate trichomes when young, 3(-5)nerved with a conspicuous network of secondary nerves below; petioles 4-15(-19) mm long and 1-2 mm broad. Inflorescence an erect, terminal thyrse mostly 3-5.3 cm from base to apex; the rachis prominently quadrangular; bracteoles sessile, essentially glabrous, persistent, gradually reduced in size upward, (1-)3-6 mm long and 0.5-2 mm wide, narrowly lanceolate to subulate and \pm concave adaxially. Pedicels 1-1.5 (-2) mm long caducously stellate pubescent, each pedicel commonly subtended by three bracteoles. Hypanthia (at anthesis) \pm globose, 2-2.5 mm long to the torus, beset with sessile stellate trichomes (these early-deciduous and generally not present on fruiting hypanthia) or persistent only as remnant arms of stellate trichomes, which superficially resemble punctiform glands. Calyx lobes (on fruiting hypanthia) persistent, sparsely stellate pubescent, erect to somewhat incurved, broadly deltoid to \pm rounded, entire to bluntly undulate with hyaline margins, 0.5 mm long and 1 mm wide; calyx teeth persistent, subulate, 2 mm long and 1.5 mm wide at base, markedly exceeding calyx lobes on mature berries. Petals 5, glabrous, erect and \pm concave at anthesis, white, \pm ovate in outline, entire, but bluntly uncinate apically, 1.5-2 mm long and mostly 1 mm wide. Stamens 10, isomorphic, erect but \pm incurved and exceeding the style; filaments white to translucent, subulate, 2 mm long; anthers 0.75-1 mm long and mostly 0.5 mm wide basally, glabrous, white, oblong to rhomboid in profile view, but broadened distally to an oval or oblong, ventrally inclined apical pore; connective thickened and prolonged dorsally at the base into a deflexed \pm truncate appendage. Ovary wholly inferior. Style straight, 2 mm long; stigma truncate. Berry pink when young but deep purple at maturity, globose, mostly 4 mm long to the torus and 4 mm in diameter. Seeds cuneate and conspicuously angled, reddish brown, vernicose, 1.5-1.75 mm long.

TYPE.—Costa Rica. San José: About 5 km NE of Cascajal, elevation 5400 ft [1646 m]. 17 Feb. 1978, *Almeda & Nakai 3627* (holotype: CAS!).

ADDITIONAL SPECIMENS EXAMINED.—Costa Rica. Heredia: pastured slopes above Río Pará Blanco on lower slopes of Cerro Zurquí about 7 km NE of San Josecito, Wilbur & Luteyn 18634 (DUKE). San José: slopes and thickets at Alto La Palma about 15 km in a straight line NE of San José, Wilbur 20340 (CAS, DUKE).

DISTRIBUTION.—A rare cloud-forest epiphyte known only from the south-facing slopes of the Cordillera Central of Costa Rica at elevations of 1600–1800 m. Flowering material has been collected in February, July, and December.

Initial study of this species led me to interpret it as an atypical large-leafed variant of *M. confertiflora*, a species that grows in the same general area. Subsequent field observations of additional flowering and fruiting material indicate that this is a distinctive taxon worthy of specific rank. Miconia confertiflora and M. grandidentata share an epiphytic habit, quadrangular branchlets, and elliptic to elliptic-ovate, distally serrulate leaves having a conspicuous network of secondary nerves below. Miconia grandidentata differs consistently in several diagnostic characters. It lacks the nodal, setiform appendages so characteristic of distal branchlets in M. confertiflora. It also differs in having stellate pubescence on branchlets and young hypanthia, an elongate thyrsoid panicle, persistent floral bracteoles, longer calyx teeth, and angulate, vernicose seeds that lack a well-defined prolonged lateral raphe. The stamens of M. grandidentata also provide several distinguishing features. Hydrated anthers, which are oblong to rhomboid in profile view, are broadened distally to an oval or oblong, ventrally inclined terminal pore, and the connective is thickened and prolonged dorsally into a deflexed caudiform appendage.

Miconia longibracteata Almeda, sp. nov. (Figure 4)

Sect. Chaenopleura. Frutex 1-3 m altus. Ramuli glabri obscure quadrangulati demum teretes. Petioli 7–16(–27) \times 1 mm; lamina (1.3–) $2.5-4.2 \times 1.1-2.8$ cm chartacea elliptica, elliptico-obovata aliquando suborbicularia apice acuta vel acuminata basi acuta vel obtusa, trinervata supra primum sparse ferrugineo-furfuracea mox glabrata, subtus primum sparse vel modice lepidota mox glabrata. Panicula 3.5-8 cm longa multiflora; flores 5-meri, pedicelli (1–) 2.4 mm longi, bracteolis 4–11(–18) mm longis oblongis vel anguste spatulatis usque ad anthesim persistentibus. Hypanthium (ad torum) $1-1.5 \times 1-1.5$ mm, lobis interioribus 1-1.5 mm altis rotundatis vel deltoideis, dentibus exterioribus acutis 0.5 mm longis. Petala $2-2.5 \times 2$ mm suborbicularia glabra. Stamina isomorphica glabra; filamenta 2.5 mm longa; antherarum thecae 0.5×0.25 mm apice late biporosae, connective sub loculis 0.5 mm prolongato dorsaliter ad basim (0.5 mm) hebeti-tuberculato. Stylus $2-2.5 \times 0.5$ mm glaber; stigma plus minusve clavatum.

Shrub 1–3 m tall. Cauline internodes glabrous, glossy black and obscurely quadrangular when

young, becoming brown and terete with age. Leaves firmly chartaceous, ciliate-serrulate (the trichomes mostly 0.5-1 mm long), (1.3-)2.5-4.2 cm long and 1.1-2.8 cm wide, elliptic, ellipticobovate or sometimes varying to suborbicular, acuminate to acute apically and acute to obtuse basally, glabrous at maturity but caducously lepidote below and glabrous to sparsely brown furfuraceous above when young, 3-nerved, the secondaries conspicuous below and mostly 2 mm apart; petioles 7-16(-27) mm long and 1 mm broad. Inflorescence an erect. laxly branched, elongate panicle 3.5-8 cm long, exceeding foliage leaves borne at the node initiating the inflorescence; rachis glabrous, quadrate to \pm rounded; bracteoles sessile, foliaceous, deciduous following anthesis and mostly absent on the infructescence, linear-oblong to narrowly spatulate, \pm concave to navicular, 4–11(–18) mm long, 0.5-3 mm wide, glabrous above and below. Pedicels terete, glabrous, (1-)2-4 mm long. Hypanthia (at anthesis) glabrous, campanulate, 1-1.5 mm long to the torus and 1-1.5 mm broad distally. Calyx lobes (on fruiting hypanthia) erect to ascending, persistent, semicircular but varying to \pm deltoid, entire, 1–1.5 mm long and 1-1.5 mm wide basally between sinuses; calyx teeth persistent, triangular, 0.5 mm long. Petals 5, antrorsely spreading, glabrous, \pm concave, white to yellowish white, suborbicular, entire, 2-2.5 mm long, 2 mm wide. Stamens 10, isomorphic; filaments glabrous, subulate, white, distally incurved, 2.5 mm long; anthers about 0.5 mm long or less, 0.25 mm wide distally, white, \pm cuneate, flared distally and terminated by a broad, \pm ovoid, ventrally inclined pore: connective markedly thickened and prolonged $(0.5 \times 0.5 \text{ mm})$ below thecae, dilated dorsally into a blunt knobby protuberance. Ovary totally inferior. Style straight, glabrous, 2-2.5 mm long; stigma \pm clavate. Berry deep purple to purpleblack at maturity, 3.5–5 mm long to the torus, 3-4(-5) mm in diameter. Seeds \pm pyriform, obscurely muriculate, mostly 1 mm long.

TYPES.—Costa Rica. Alajuela: wooded slopes of Volcán Poás about 12 km w of Varablanca, elevation ca. 2400 m, 21 Jan. 1968, *Wilbur & Stone 9845* (holotype: DUKE!; isotypes: CAS!, US!).

ADDITIONAL SPECIMENS EXAMINED.—Costa Rica, Alajuela: Volcán Poás, forest between crater and cold lake, *Davidse* & *Pohl 1169* (US); Volcán Poás, cloud forest along road 2.5– 3.5 miles [4.0–5.6 km] w of Poasito, *Webster, Miller & Miller 12242* (DUKE, US); se slope of Volcán Poás, *Hatheway 1388*

ALMEDA: NEW SPECIES OF MICONIA



FIGURE 4. *Miconia longibracteata* Almeda. *A*, habit, \times ca. $\frac{1}{2}$; *B*, seeds, $\times 14$; *C*, petal, $\times 9$; *D*, representative leaves, upper surface (left) and lower surface (right), $\times 1$; *E*, mature berry, \times ca. 4; *F*, stamens, lateral view (left) and $\frac{3}{4}$ ventral view (right), $\times 10$: *G*, stamens, dorsal view (left) and ventral view of anther and prolonged connective (right), $\times 10$. (*A & D* from *Schnell* 727; *B*, *C*, *E*-*G* from *Wilbur & Stone* 9845.)

(DS, US). Cartago: El Empalme, Schnell 727 (US-2 sheets); Talamanca Range, Panamerican Highway, Carlson 3611 (US); El Cañon (Carretera Panamericana), O. Jimenez 42 (US); La Chonta, Schnell 725 (US); Panamerican Highway about 24 km w of Villa Mills, Wilbur & Stone 8800 (DUKE); s of El Empalme, A. Jimenez 1979 (US). Cartago/San José border: 6 km Nw of Dos Amigos, Wilbur & Luteyn 18321 (DUKE); 5 km Nw of Ojo de Agua or 19 km se of El Empalme, Wilbur 28674 (DUKE); 5 km se of Trinidad along Carretera Interamericana, Wilbur 27780 (DUKE).

DISTRIBUTION.—Endemic to Costa Rica where it is presently known from the slopes of Volcán Poás and the Cordillera de Talamanca at elevations of 2000–3000 m. Available collections indicate that flowering and fruiting occurs sporadically throughout the year.

Among Costa Rican taxa of Miconia, this species is recognized by the combination of large foliaceous floral bracteoles, prevailingly glabrous foliage, suborbicular petals, and peculiar androecial morphology (see Fig. 4F). Staminal posture and morphology are best observed in pickled or boiled material hydrated with the aid of a wetting agent. Materials so treated show short, compressed, anther thecae terminating in a broad apical pore; the connective which is conspicuously thickened and prolonged below the thecae is narrowly triangular in ventral view, knobby and somewhat angulate in profile view, and \pm horseshoe shaped in dorsal view. In many respects the elaborate connective is reminiscent of a pedestal providing anchorage and support for the anther. This distinctive anther morphology appears to represent an extreme in the evolutionary line that has led to great reduction in anther size. The very broad apical pores and

pronounced geniculation of the filaments consistently bring anthers to an incurved position within the flower and may contribute to prevalent self-pollination.

In size and shape of floral bracteoles and anthers, *M. longibracteata* is most similar to *M. concinna* (also treated herein). The characters distinguishing these species are enumerated in the discussion under *M. concinna. Miconia longibracteata* also resembles *M. superposita* Wurdack in vegetative aspect. The latter, a Colombian species, differs in having squamulose pubescence on juvenile branchlets, shorter bracteoles $(3.7 \times 0.8 \text{ mm})$, and 4-celled anthers with the dorsal loculus of each theca overlapping but distal to the ventral one.

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